

ENGINEERING DEPARTMENT
TECHNICAL REPORT

TR-RE-CCSD-FO-1109-3

June 27, 1967

SATURN IB PROGRAM

TEST REPORT
FOR

BACK PRESSURE REGULATOR, $2\frac{1}{2}$ -INCH GRAYLOC CONNECTIONS, 6000 PSIG

Grove Valve and Regulator Company Drawing Number M-13636-R, Model PB 300

NASA Drawing Number 10428582

FACILITY FORM 802

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CHRYSLER
CORPORATION

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ABSTRACT

This report presents the results of tests performed on one specimen of Back Pressure Regulator 10428582. The following tests were performed:

- | | |
|-------------------------|---------------------|
| 1. Receiving Inspection | 4. Low Temperature |
| 2. Proof Pressure | 5. High Temperature |
| 3. Functional | 6. Salt Fog |

The specimen satisfactorily completed the above tests with the exception of the proof pressure and salt fog tests.

During the proof pressure test, the diaphragm relaxed and was replaced. The diaphragm relaxed again during the post salt fog functional test and testing was discontinued. Measurements of the dome retaining boss taken after disassembly of the specimen showed that individual dimensions did not conform to vendor drawings M-13635-36 and M-13635-38; however, the boss clearance was within specifications.

The specimen failed to meet the requirements of the Kennedy Space Center as stated in TP-RE-CCSD-FO-1109-2F and NASA drawing number 10428582.

TEST REPORT

FOR

BACK PRESSURE REGULATOR, $2\frac{1}{2}$ -INCH GRAYLOC CONNECTIONS, 6000 PSIG

Grove Valve and Regulator Company Drawing Number M-13636-R, Model PB 300

NASA Drawing Number 10428582

June 27, 1967

CHRYSLER CORPORATION SPACE DIVISION - NEW ORLEANS, LOUISIANA

FOREWORD

The tests reported herein were conducted for the John F. Kennedy Space Center by Chrysler Corporation Space Division (CCSD), New Orleans, Louisiana. This document was prepared by CCSD under contract NAS 8-4016, Part VII, CWO 271620.

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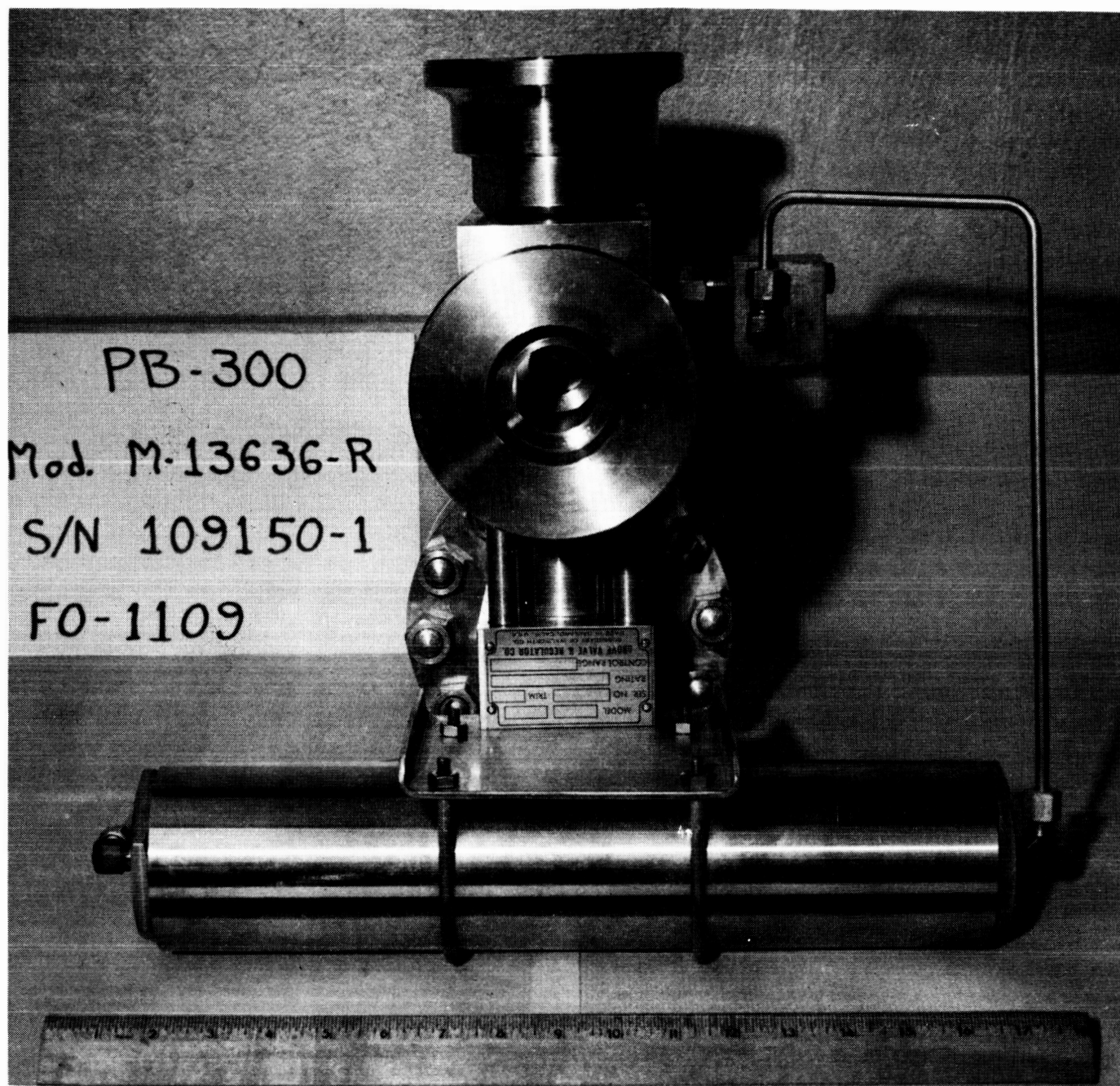
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Back Pressure Regulator, 2 $\frac{1}{2}$ -inch Grayloc Connections, 6000 psig

CHECK SHEET

FOR

BACK PRESSURE REGULATOR

2½-INCH GRAYLOC CONNECTIONS, 6000 PSIG

MANUFACTURER: Grove Valve and Regulator Company
MANUFACTURER'S DRAWING NUMBER: M-13636-R, Model PB 300
NASA DRAWING NUMBER: 10428582
TEST AGENCY: Chrysler Corporation Space Division, New Orleans, Louisiana
AUTHORIZING AGENCY: NASA KSC

I. FUNCTIONAL REQUIREMENTS

A. OPERATING MEDIUM:	GN ₂
B. OPERATING PRESSURE:	Zero to 6000 psig
C. BACK PRESSURE REGULATING RANGE:	3500 psig to 6000 psig
D. FLOW:	8000 scfm
E. PROOF PRESSURE:	9000 psig

II. CONSTRUCTION

A. MATERIAL:	
Body	316 stainless steel
Diaphragm	Nylon
Seats	316 Stainless Steel
B. CONNECTIONS:	2½-inch (XXS) Grayloc clamp type connections

III. ENVIRONMENTAL REQUIREMENTS

A. OPERATING TEMPERATURE RANGE:	-20 to +120°F
B. SALT FOG	

IV. LOCATION AND USE

Used in CCF to maintain a 3500-psig back pressure in gaseous nitrogen system.

TEST SUMMARY

BACK PRESSURE REGULATOR 10428582

Environment	Units	Operational Boundary	Test Objective	Test Results	Remarks
Proof Pressure Test	1	9000 psig	Check for leakage and distortion	Un-satisfactory	Diaphragm had to be replaced
Functional Test	1	No external leakage up to 6000 psig	Check cracking and reseal pressures at 3500, 4000, 5000, and 6000 psig	Satisfactory	No external leakage. Internal leakage 28 bubbles/minute (average)
Low Temperature Test	1	-20 (\pm 2)°F	Determine operating ability during and after low temperature test	Satisfactory	Test completed Dome bolts had to be retorqued
High Temperature Test	1	125 (\pm 2)°F	Determine operating ability during and after high temperature test	Satisfactory	Test completed
Salt Fog Test	1	240 hours exposure to salt solution (5% salt by weight) pH 7.0 (+0.2, -0.5) s.g.: 1.030 (+0.007) at 95 (\pm 3, -4)°F	Determine operating ability after exposure to salt fog	Un-satisfactory	Diaphragm slipped out of dome retaining boss allowing communication between cylinder unit and inlet

SECTION I

INTRODUCTION

1.1 SCOPE

This report presents the results of tests that were performed to determine if Back Pressure Regulator 10428582 meets the operational requirements for John F. Kennedy Space Center Launch Complexes 34 and 37B. A summary of the test results is presented on page viii.

1.2 ITEM DESCRIPTION

1.2.1 One specimen of back pressure regulator 10428582 was tested.

1.2.2 The regulator is used to maintain 3500 psig back pressure in a gaseous nitrogen system. The regulator is a pneumatically controlled regulator which can be adjusted to maintain between 3500 and 6000 psig back pressure. The regulator has a maximum rate of flow of 8000 scfm of GN₂ at 3500 psig back pressure. The regulator has a stainless steel body, 2½-inch stainless steel extra strong Grayloc clamp type connections, and stellite seats.

1.3 APPLICABLE DOCUMENTS

The following documents contain the test requirements for Back Pressure Regulator 10428582:

- a. KSC-STD-164(D), dated September 17, 1964, Standard Environmental Test Methods for Ground Support Equipment Installations at Cape Kennedy
- b. NASA Drawing 10428582
- c. Cleaning Standard MSFC-STD-164 (D)
- d. Test Plan CCSD-FO-1109-1F
- e. Test Procedure TP-RE-CCSD-FO-1109-2F

SECTION II

RECEIVING INSPECTION

2.1 TEST REQUIREMENTS

The specimen shall be visually and dimensionally inspected for conformance with the applicable specifications prior to testing.

2.2 TEST PROCEDURE

A visual and dimensional inspection of the specimen was performed to determine compliance with NASA drawing 10428582 and the applicable vendor drawing to the extent possible without disassembly of the test specimen. At the same time, the test specimen was also inspected for poor workmanship and manufacturing defects.

2.3 TEST RESULTS

The specimen complied with NASA drawing 10428582. No evidence of poor workmanship or manufacturing defects was observed.

2.4 TEST DATA

The data presented in tables 2-1 and 2-2 were recorded during the inspection.

Table 2-1. Specimen Nomenclature

Name:	Back Pressure Regulator
Size	2½-inch
NASA Dwg No.	10428582
Model	M-13636-R (FB 300)
Serial No.	109150-1

Table 2-2. Specimen Dimensions

Length	14.875 inches
Height	16.125 inches

SECTION III

PROOF PRESSURE TEST

3.1 TEST REQUIREMENTS

- 3.1.1 The test specimen shall be subjected to 9000 psig for 5 minutes.
- 3.1.2 The test specimen shall be examined for leakage and distortion.

3.2 TEST PROCEDURE

- 3.2.1 The test setup was assembled as shown in figures 3-1 and 3-2 using the equipment listed in table 3-1. The hand valves and regulator were closed.
- 3.2.2 The inlet of hand valve 4 was pressurized to 9000 psig from GN₂ pressure source 2. Hand valve 4 was opened and the supply pressure was monitored on pressure gage 6.
- 3.2.3 Hand valve 8 was opened. The test specimen was pressurized to 9000 psig by adjusting regulator 7. The test specimen pressure was monitored on pressure gage 9.
- 3.2.4 Hand valve 8 was closed. The specimen was checked for leakage for 5 minutes by checking for bubbles in water bath 11.
- 3.2.5 Following the 5-minute leak check period, hand valve 8 was opened. The test specimen pressure was vented by closing hand valve 4 and opening hand valve 10. All hand valves and the regulator were closed.
- 3.2.6 The test specimen was removed from the test setup and the specimen was examined for distortion.

3.3 TEST RESULTS

- 3.3.1 The specimen was slowly pressurized with ambient GN₂. External leakage was noted at 800 psig and at 8000 psig. Leakage was too excessive to maintain pressure. Disassembly of the dome revealed a relaxed diaphragm as shown in figure 3-3.
- 3.3.2 A new diaphragm was placed in the specimen and the proof pressure test was successfully completed.

3.4 TEST DATA

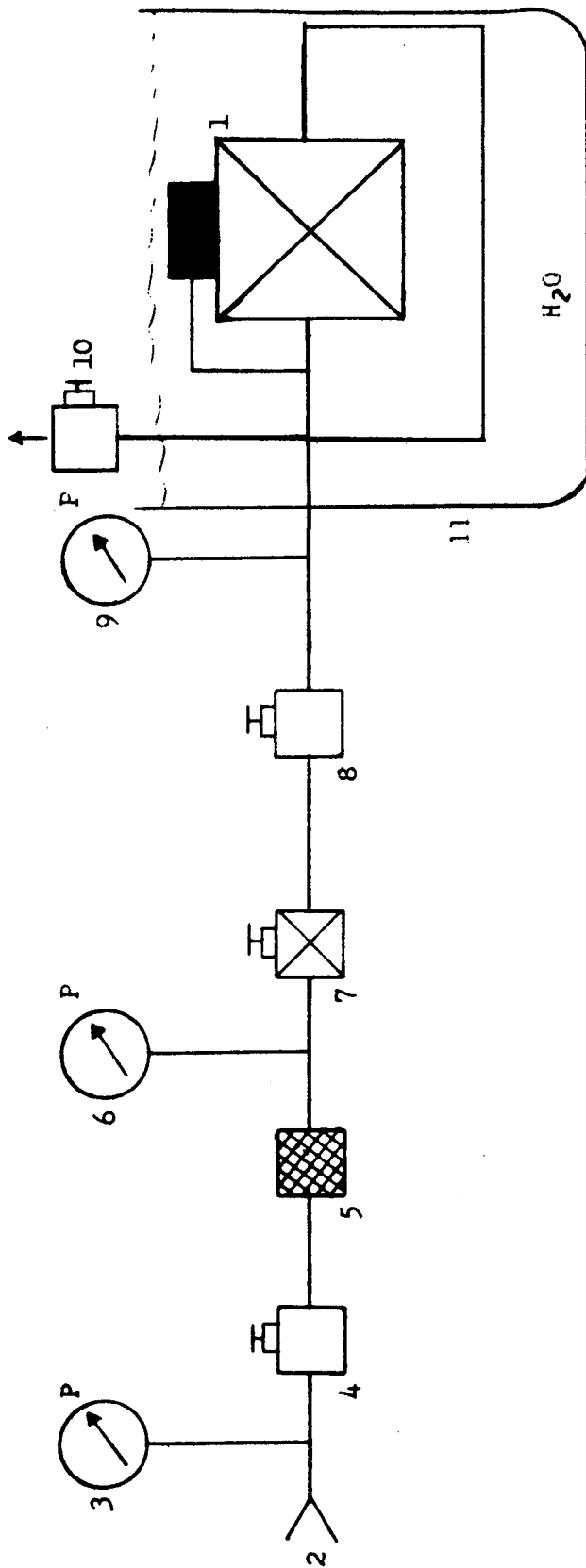
The data recorded during the proof pressure test are shown in table 3-2.

Table 3-1. Proof Pressure Test Equipment List

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Test Specimen	Grove Valve and Regulator Co.	M-13636-R (PB 300)	109150-1	Back pressure regulator
2	GN ₂ Pressure Source	CCSD	NA	NA	11,000-psig
3	Pressure Gage	Maxisafe	NA	95-1647-B	0-to 15,000-psig +1.0% FS Cal date 12-15-66
4	Hand Valve	Dragon	P5004	NA	$\frac{1}{4}$ -inch, bar stock
5	Filter	Fluid Dynamics	FX1561	4066	10-micron
6	Pressure Gage	Maxisafe	NA	95-1648-B	0- to 20,000-psig +1.0% FS Cal date 12-15-66
7	Regulator	Tescom	26-1021- 24	8360	0-to 12,000-psig
8	Hand Valve	Tescom	30-1100- 104C	NA	$\frac{1}{4}$ -inch, bar stock 0-to 10,000-psig
9	Pressure Gage	Master Gauge	NA	95-1185-B	0-to 20,000-psig +0.1% FS Cal date 1-6-67
10	Hand Valve	Aminco	44-13106	NA	$\frac{1}{4}$ -inch, bar stock
11	Water Bath	CCSD	NA	NA	

Table 3-2. Proof Pressure Test Results

Initial	
Pressure	8000 psig
Leakage	External leakage from 800 to 8000 psig
Distortion	None
After Replacement of Diaphragm	
Pressure	9000 psig
Leakage	None
Distortion	None



Note: All lines 1/4 inch.
Refer to table 3-1 for item identification.

Figure 3-1. Proof Pressure Test Schematic

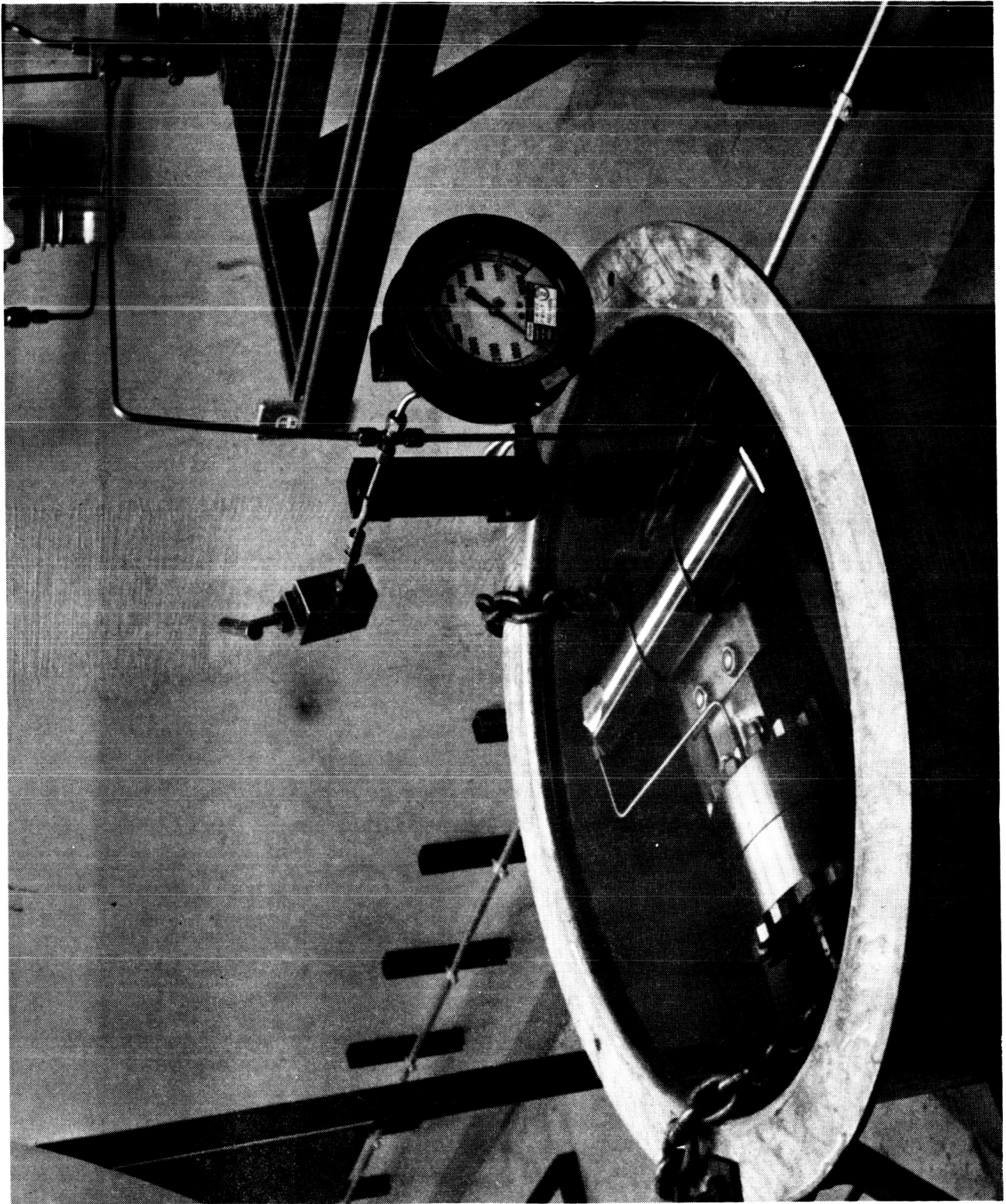


Figure 3-2. Proof Pressure Test Setup



Figure 3-3. Relaxation of Regulator Diaphragm

SECTION IV

FUNCTIONAL TEST

4.1 TEST REQUIREMENTS

- 4.1.1 The cracking and reseal pressures of the test specimen shall be determined at pressures of 3500, 4000, 5000, and 6000 psig.
- 4.1.2 The test specimen shall be checked for internal and external leakage at pressures of 3500, 4000, 5000, and 6000 psig.

4.2 TEST PROCEDURE

- 4.2.1 The test setup was assembled as shown in figures 4-1 and 4-2 using the equipment listed in table 4-1. The hand valves, the regulator, and the test specimen were closed.
- 4.2.2 The inlet of hand valve 4 was pressurized to 10,000 psig with GN₂. Hand valve 4 was opened and the 10,000 psig supply pressure was monitored on pressure gage 6.
- 4.2.3 The test specimen inlet was pressurized to 3500 psig by adjusting regulator 7. The test specimen pressure was monitored on pressure gage 8.
- 4.2.4 The test specimen was adjusted to maintain an inlet pressure of 3500 psig by monitoring pressure gage 8 and the appearance of bubbles in water container 10. The specimen was adjusted until no bubbles appeared at pressures below 3500 psig on gage 8.
- 4.2.5 The test specimen was checked for internal leakage for 5 minutes at 3500 psig by observing the appearance of bubbles in water container 10. External leakage was checked with a soap solution.
- 4.2.6 Following the 5-minute leakage check, the test specimen inlet pressure was slowly increased by adjusting regulator 7 until cracking pressure was attained by the observance of bubbles in water container 10. The test specimen cracking pressure was recorded.
- 4.2.7 The test specimen inlet pressure was reduced by adjusting regulator 7 until reseating pressure was attained as indicated by the disappearance of bubbles in water container 10. The test specimen reseating pressure was recorded.
- 4.2.8 After the reseating pressure had been determined, the test specimen inlet pressure was relieved by closing regulator 7 and opening hand valve 9.
- 4.2.9 The test described in paragraphs 4.2.3 through 4.2.8 was repeated as necessary until consistent data was obtained.
- 4.2.10 The test described in paragraphs 4.2.3 through 4.2.9 was repeated at test specimen inlet pressures of 4000, 5000, and 6000 psig.

4.3

TEST RESULTS

4.3.1

The cracking and reseal pressures of the specimen were determined at pressures of 3500, 4000, 5000, and 6000 psig. There was no external leakage.

4.3.2

The internal leakage rates were 22, 29, 32, and 29 bubbles per minute at set pressures of 3500, 4000, 5000, and 6000 psig, respectively.

4.4

TEST DATA

The data recorded during the initial functional test are presented in table 4-2.

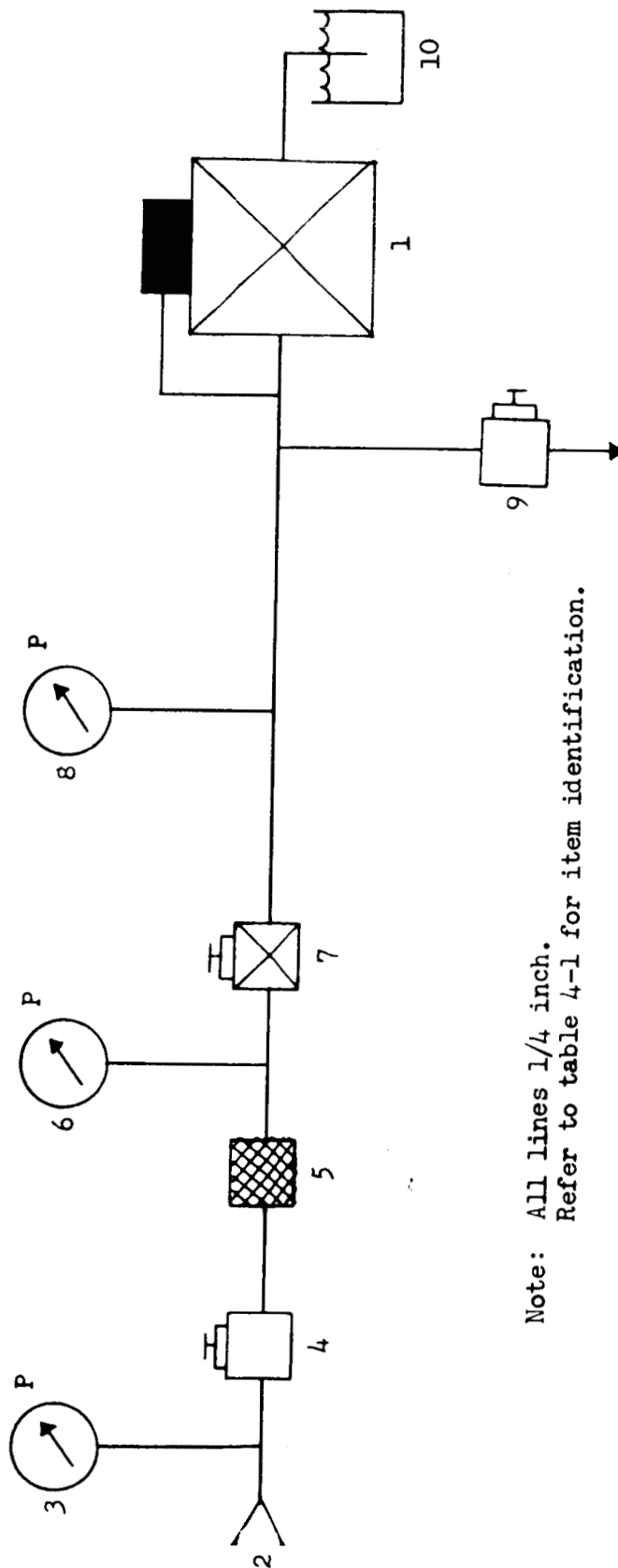
Table 4-1. Functional Test Equipment List

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Test Specimen	Grove Valve and Regulator Co.	M-13636-R (PB 300)	109150-1	Back pressure regulator
2	GN ₂ Pressure Source	CCSD	NA	NA	10,000 psig
3	Pressure Gage	Maxisafe	NA	95-1647-B	0-to 15,000-psig +1.0% FS Cal date 3-15-67
4	Hand Valve	Dragon	P5004	NA	$\frac{1}{4}$ -inch, bar stock
5	Filter	Fluid Dynamics	FX1561	4066	10-micron
6	Pressure Gage	Maxisafe	NA	95-1648-B	0-to 20,000-psig +1.0% FS Cal date 3-15-67
7	Pressure Regulator	Tescom	26-1021-24	8360	0-to 6000-psig
8	Pressure Gage	Heise	NA	012452	0-to 10,000-psig +0.1% FS Cal date 3-19-67
9	Hand Valve	Aminco	44-13106	NA	$\frac{1}{4}$ -inch, bar stock
10	Water Container	CCSD	NA	NA	1 gal. capacity

Table 4-2. Initial Functional Test Results

Set Pressure (psig)	Cracking Pressure (psig)	Reseat Pressure (psig)	Internal Leakage (bubbles/min)
3500	3560	3520	22
4000	4035	4030	29
5000	5040	5025	32
6000	6070	6055	29

No external leakage was observed.



Note: All lines 1/4 inch.
Refer to table 4-1 for item identification.

Figure 4-1. Functional Test Schematic

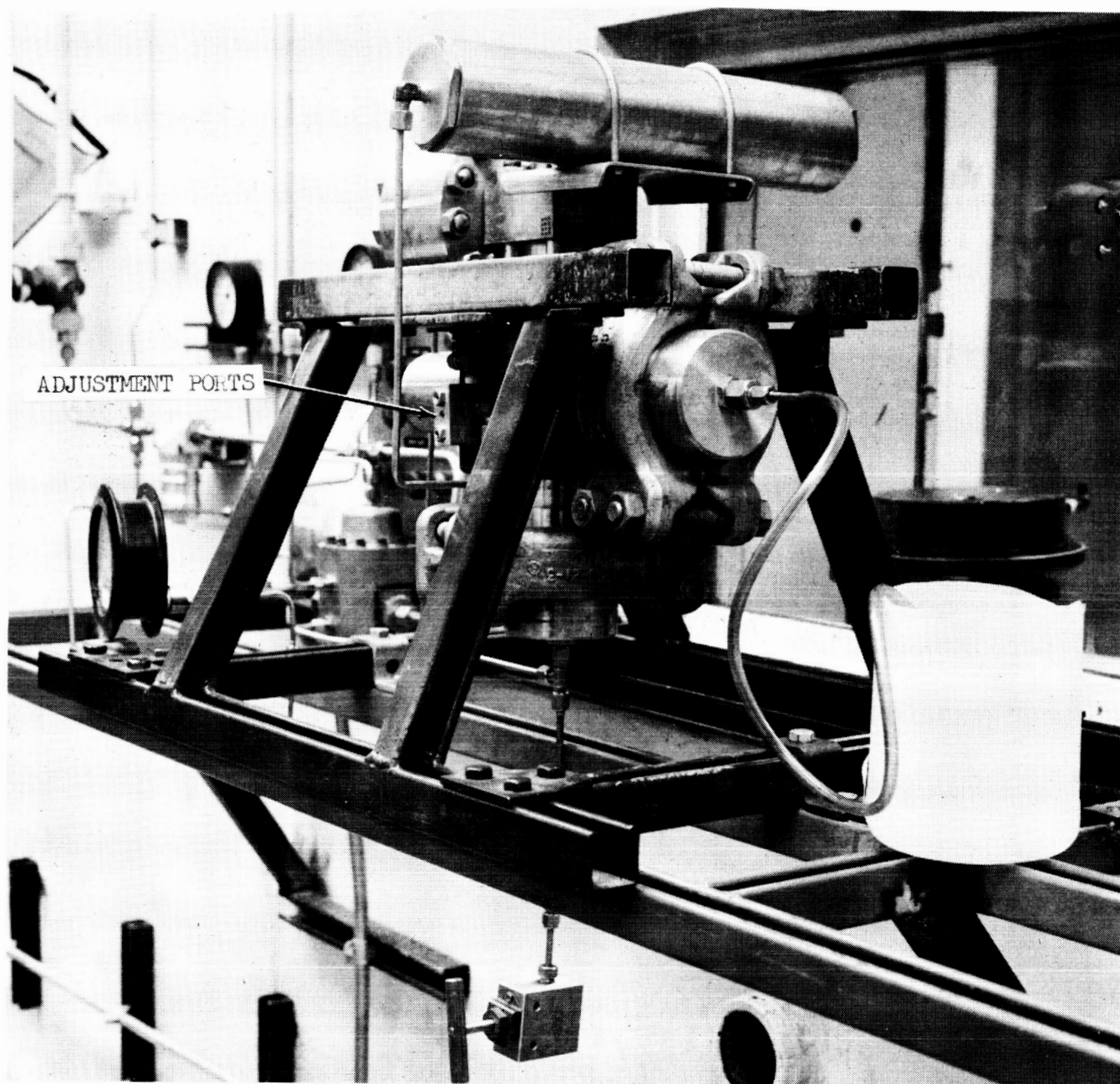


Figure 4-2. Functional Test Setup

SECTION V

LOW TEMPERATURE TEST

5.1 TEST REQUIREMENT

- 5.1.1 The test specimen shall be subjected to a low temperature test at -20°F in accordance with section V of KSC-STD-164(D).
- 5.1.2 The test specimen shall be subjected to a functional test in accordance with section IV during and after the low temperature test.

5.2 TEST PROCEDURE

- 5.2.1 The test setup was assembled as shown in figure 5-1 using the equipment listed in table 5-1.
- 5.2.2 The temperature of the chamber was reduced to -20 (+0, -5)°F, and the temperature was allowed to stabilize.
- 5.2.3 When temperature stabilization had been attained, the test specimen was subjected to a functional test as specified in section IV.
- 5.2.4 Following the functional test at -20°F, the test specimen was allowed to return to ambient conditions. A functional test was performed as specified in section IV.

5.3 TEST RESULTS

- 5.3.1 The specimen was subjected to a low temperature test at -20°F.
- 5.3.2 A functional test was performed during the low temperature test. During the 6000 psig cracking test, severe external leakage occurred at the dome joint. The specimen was returned to ambient conditions and the dome bolts were retorqued. The specimen was returned to -20°F and the functional test was successfully completed. A functional test after the low temperature test was satisfactorily completed.

5.4 TEST DATA

The data recorded during and after the low temperature test are presented in tables 5-2 and 5-3 respectively.

Table 5-1. Low Temperature Test Equipment List

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Test Specimen	Grove Valve and Regulator Co.	M-13636-R (PB 300)	109150-1	Back pressure regulator
2	GN ₂ Pressure Source	CCSD	NA	NA	10,000 psig
3	Pressure Gage	Maxisafe	NA	95-1647-B	0-to 15,000-psig +1.0% FS Cal date 3-15-67
4	Hand Valve	Dragon	P5004	NA	$\frac{1}{4}$ -inch
5	Filter	Fluid Dynamics	FX1561	4066	10-micron
6	Pressure Gage	Maxisafe	NA	95-1648-B	0-to 20,000-psig +1.0% FS Cal date 3-15-67
7	Pressure Regulator	Tescom	26-1021- 24	8360	0-to 6000-psig
8	Pressure Gage	Heise	NA	012452	0-to 10,000-psig +0.1% FS Cal date 3-19-67
9	Hand Valve	Aminco	44-13106	NA	$\frac{1}{4}$ -inch
10	Water Container	CCSD	NA	NA	
11	Low Temperature Chamber	CCSD	NA	NA	As specified in KSC-STD-164(D)

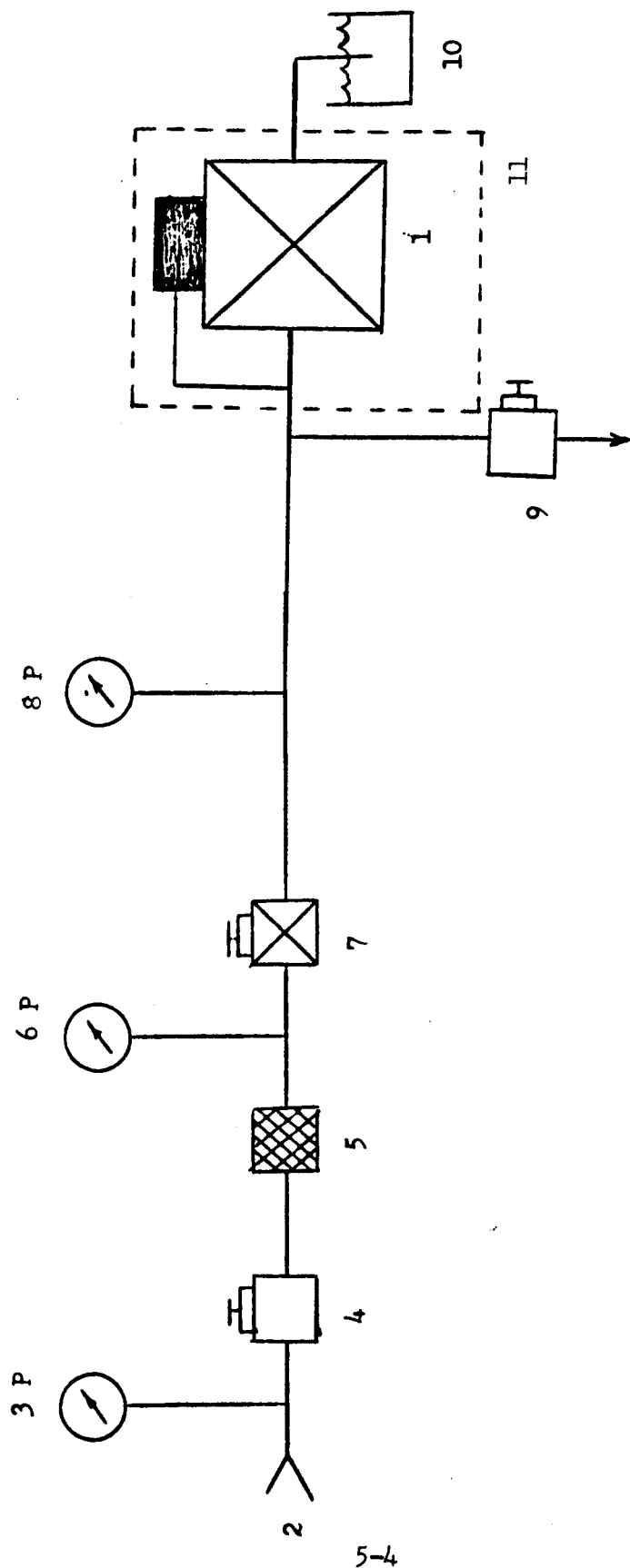
Table 5-2. Low Temperature Functional Test Results

Set Pressure (psig)	Cracking Pressure (psig)	Reseat Pressure (psig)	Leakage (bubbles/min)
3500	3580	3550	None
4000	4085	4065	None
5000	5080	5030	None
6000	----	----	Excessive*
	(After retorquing dome bolts)		
6000	6240	6220	None

* External leakage around dome joint. No internal leakage.

Table 5-3. Post Low Temperature Functional Test Results

Set Pressure (psig)	Cracking Pressure (psig)	Reseat Pressure (psig)	Leakage (bubbles/min)
3500	3575	3550	None
4000	4070	4045	None
5000	5060	5040	None
6000	6070	6050	None



Note: All lines $\frac{1}{4}$ inch.
Refer to table 5-1 for item identification.

Figure 5-1. Low Temperature Test Schematic

SECTION VI

HIGH TEMPERATURE TEST

6.1 TEST REQUIREMENTS

- 6.1.1 The test specimen shall be subjected to a high temperature test at 125°F in accordance with section VI of KSC-STD-164(D).
- 6.1.2 The test specimen shall be subjected to a functional test in accordance with section IV during and after the high temperature test.

6.2 TEST PROCEDURE

- 6.2.1 The test setup was assembled as shown in figure 6-1 using the equipment listed in table 6-1.
- 6.2.2 The temperature of the chamber was raised to 120 (-0, +5)°F. This temperature was maintained for 72 (+2, -0) hours.
- 6.2.3 During the 72-hour period, a functional was performed as specified in section IV.
- 6.2.4 Following the 72-hour period, the specimen was allowed to return to ambient temperature. A functional test was performed as specified in section IV.

6.3 TEST RESULTS

- 6.3.1 The specimen was subjected to a high temperature test at 125°F for 72 hours.
- 6.3.2 A functional test was performed during and after the high temperature test with satisfactory results.

6.4 TEST DATA

The data recorded during and after the high temperature test are presented in tables 6-2 and 6-3, respectively.

Table 6-1. High Temperature Test Equipment List

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Test Specimen	Grove Valve and Regulator Co.	M-13636-n (PB 300)	109150-1	Back pressure regulator
2	GN ₂ Pressure Source	CCSD	NA	NA	0-to 10,000-psig
3	Pressure Gage	Maxisafe	NA	95-1647-B	0-to 15,000-psig +1.0% FS Cal date 3-15-67
4	Hand Valve	Dragon	P5004	NA	$\frac{1}{4}$ -inch
5	Filter	Fluid Dynamics	FX1561	4006	10-micron
6	Pressure Gage	Maxisafe	NA	95-1648-B	0-to 20,000-psig +1.0% FS Cal date 12-3-66
7	Pressure Regulator	Tescom	26-1021-24	8360	0-to 6000-psig
8	Pressure Gage	Heise	NA	012452	0-to 10,000-psig +0.1% FS Cal date 3-19-67
9	Hand Valve	Aminco	44-13106	NA	$\frac{1}{4}$ -inch
10	Water Container	CCSD	NA	NA	
11	High Temperature Chamber	CCSD	NA	NA	As specified in KSC-STD-164(D)

Table 6-2. High Temperature Functional Test Results

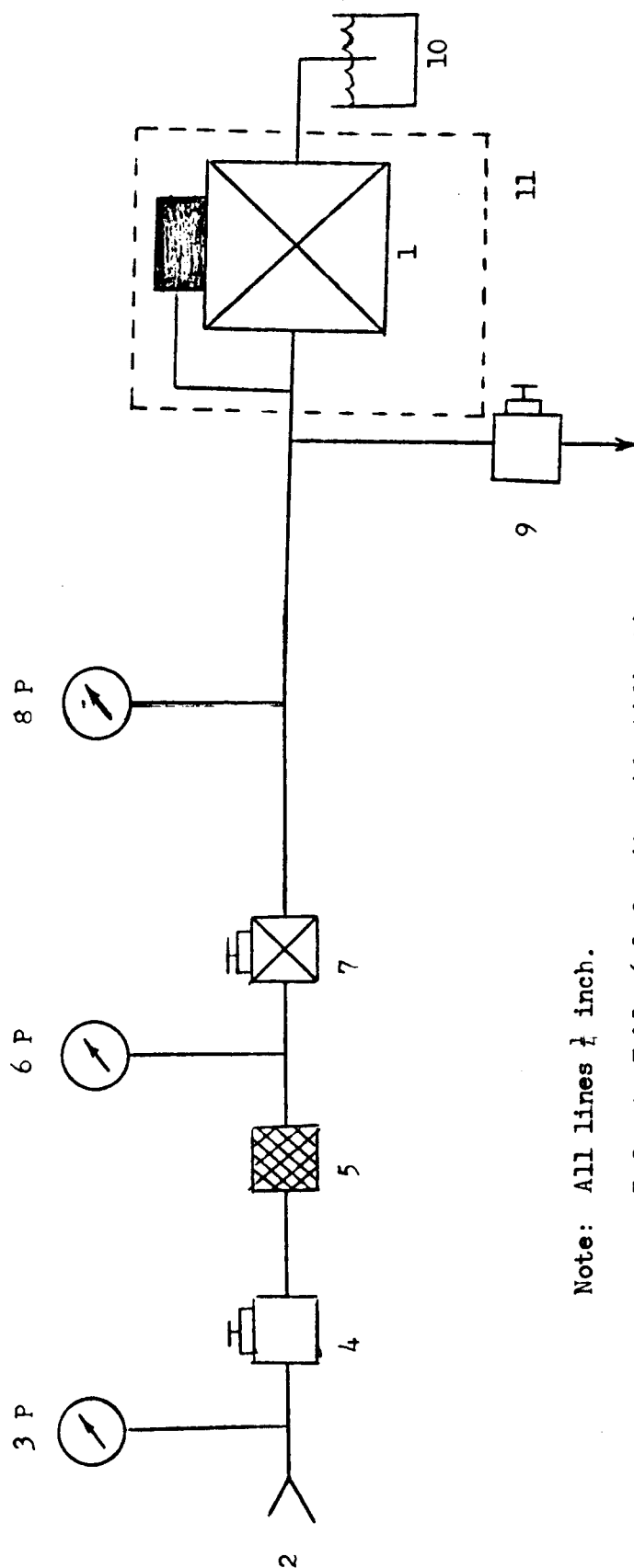
Set Pressure (psig)	Cracking Pressure (psig)	Reseat Pressure (psig)	Leakage* (bubbles/min)
3500	3570	3560	20
4000	4065	4030	20
5000	5040	5030	20
6000	6060	6050	20

* Internal leakage only. No external leakage.

Table 6-3. Post High Temperature Functional Test Results

Set Pressure (psig)	Cracking Pressure (psig)	Reseat Pressure (psig)	Leakage* (bubbles/min)
3500	3580	3560	20
4000	4065	4050	20
5000	5160	5140	20
6000	6060	6050	20

* Internal leakage only. No external leakage.



Note: All lines $\frac{1}{4}$ inch.

Refer to Table 6-1 for item identification.

Figure 6-1. High Temperature Test Schematic

SECTION VII

SALT FOG TEST

7.1 TEST REQUIREMENTS

- 7.1.1 The test specimen shall be subjected to a salt fog test. The test specimen shall be placed in a test chamber with all the additional equipment described in KSC-STD-164(D). The test specimen shall be subjected to an atomized salt solution for a period of 240 (+2) hours.
- 7.1.2 The salt solution shall contain 5 parts by weight of salt and 95 parts by weight of H₂O with no more than 200 parts per million of total solids. The specific gravity of the salt solution shall be from 1.023 to 1.037 with a reference temperature of 95 (+2, -4)°F. The salt solution shall also have a pH value of 6.5 to 7.2. Diluted, chemically pure, hydrochloric acid or chemically pure sodium hydroxide may be used to adjust the pH value.
- 7.1.3 Measurement of the characteristics of the salt solution shall be made according to KSC-STD-164(D).
- 7.1.4 Following the 240-hour exposure, the test specimen shall be subjected to a functional test within 1 hour after the specimen is returned to room ambient conditions.

7.2 TEST PROCEDURE

- 7.2.1 The test specimen was visually inspected for corrosion, dirt, and oily films. Oily films other than those required for normal service usage and all dirt particles were removed. The test specimen was placed in the salt fog chamber.
- 7.2.2 The test specimen was exposed to the salt fog conditions for 240 (+2) hours.
- 7.2.3 Upon completion of the salt fog test the test specimen was removed from the chamber and salt deposits were removed from the specimen to the extent necessary to make mechanical connections. Within one hour after completing the exposure to salt fog, a functional test was performed as specified in section IV.

7.3 TEST RESULTS

- 7.3.1 During the post salt fog functional test the specimen developed severe internal leakage during the 5000 psig cracking test. The specimen was disassembled and inspection revealed that the diaphragm had pulled out of the dome retaining boss allowing communication between the cylinder unit and the inlet of the specimen (see figure 7-2). The dimensions of the dome retaining boss were measured for conformance with vendor drawings M-13635-36 and M-13635-38 (see circled dimensions in figures 7-3 and 7-4). The measurements were not within the specified tolerances of the

vendor drawings; however, the boss clearance was within the specified tolerance.

7.3.2

Testing was discontinued.

7.4

TEST DATA

The data recorded during the post salt fog functional test are presented in table 7-2. The measurements taken after the post salt fog functional test are presented in table 7-3.

Table 7-1. Salt Fog Test Equipment List

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Test Specimen	Grove Valve and Regulator Co.	M-13636-R (FP 300)	108150-1	Back pressure regulator
2	Salt Fog Chamber	Industrial Filter and Pump Mfg. Co.	411.1C	5-3628	As specified in E-STD-164(D)

Table 7-2. Post Salt Fog Functional Test Results

Set Pressure (psig)	Cracking Pressure (psig)	Reseat Pressure (psig)	Leakage (bubbles/min)
3500	3570	3500	20*
4000	4055	4000	20*
5000	----	----	--
6000	----	----	--

* Internal leakage only. No external leakage.

Table 7-3. Measurements of Dome Retaining Boss

Place of Measurement	Specimen	Drawing
Flat Dome Boss Height	0.068 in.	0.076 (± 0.002) in.
PE - Regulator Boss Depth	0.130 in.	0.135 (± 0.001) in.
Maximum Clearance	0.062 in.	0.062 in.

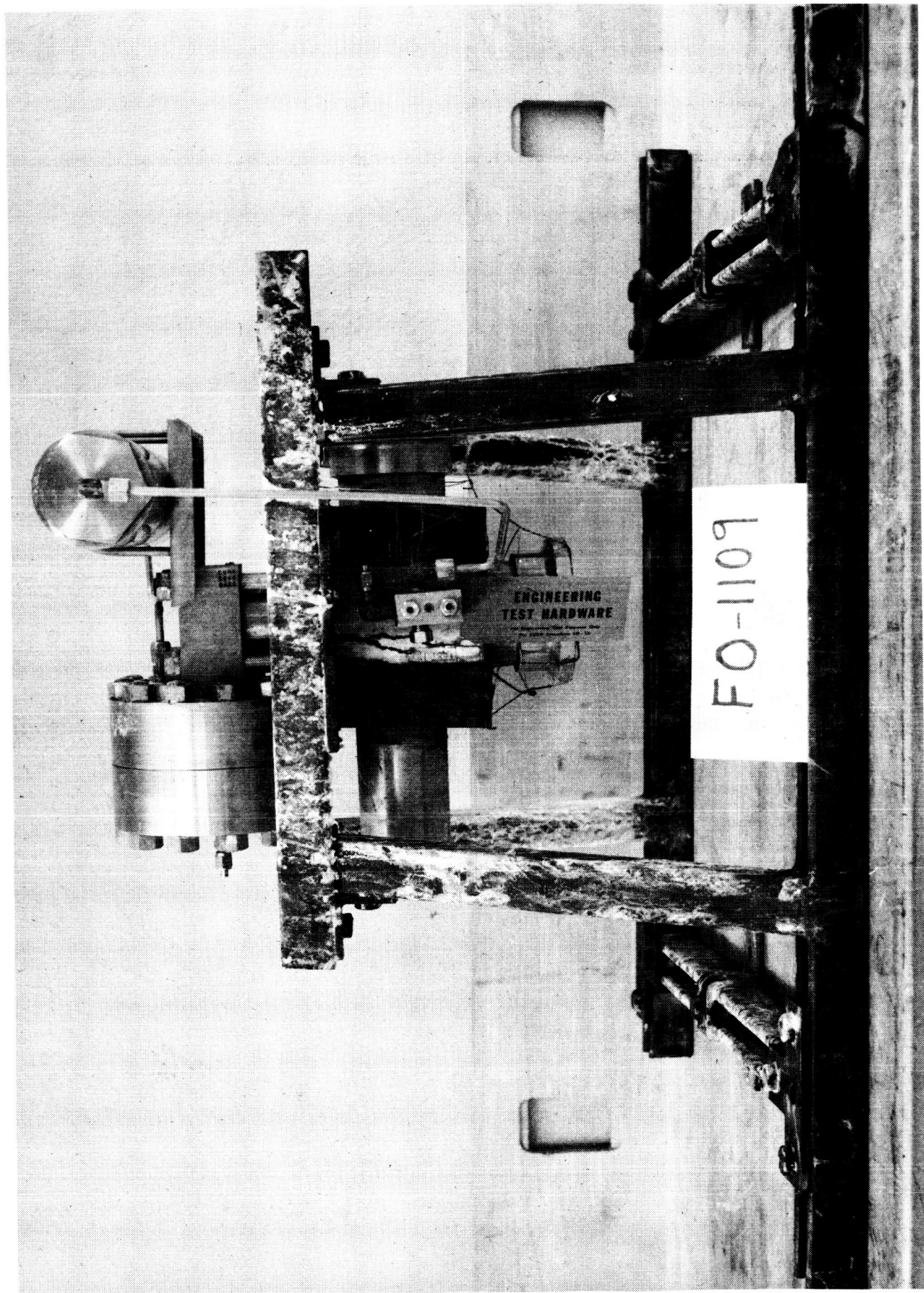


Figure 7-1. Test Specimen After Salt Fog Exposure

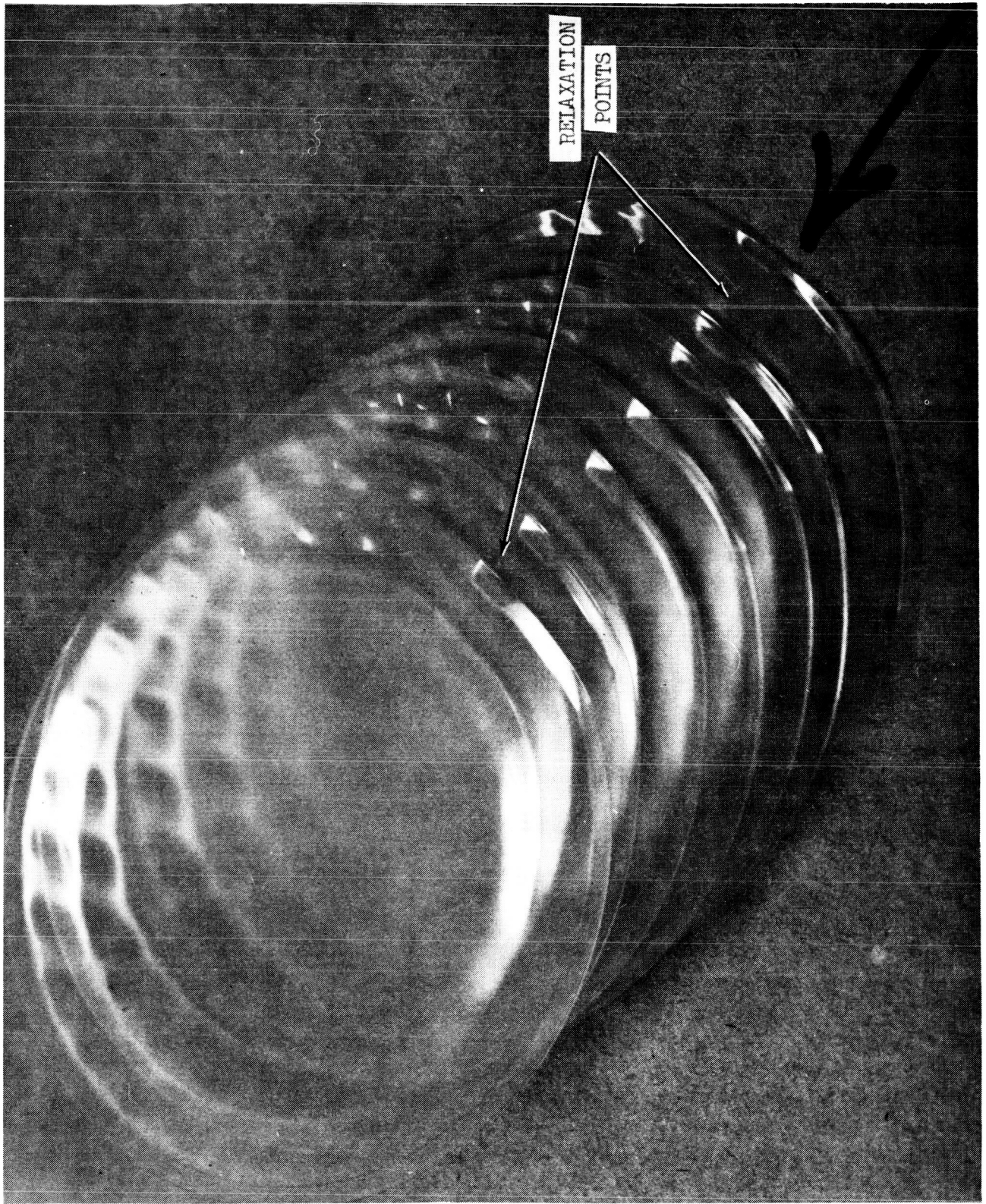


Figure 7-2. Diaphragm Failure

M-13635-36

REGULATOR

PART. NO. ROUGH STOCK NO. 23-51-7

SCALE FULL DWN. BY DATE 9-29-66

R. S. WT. FIN. WT. 17.5000

BOTTOM CASE
SEMI-FINISHED

ASTERISK(*) INDICATES TOLERANCE
FOR MACHINING PURPOSES ONLY.

TO BE PASSIVATED ON
SUBASSEMBLY M-13635-37

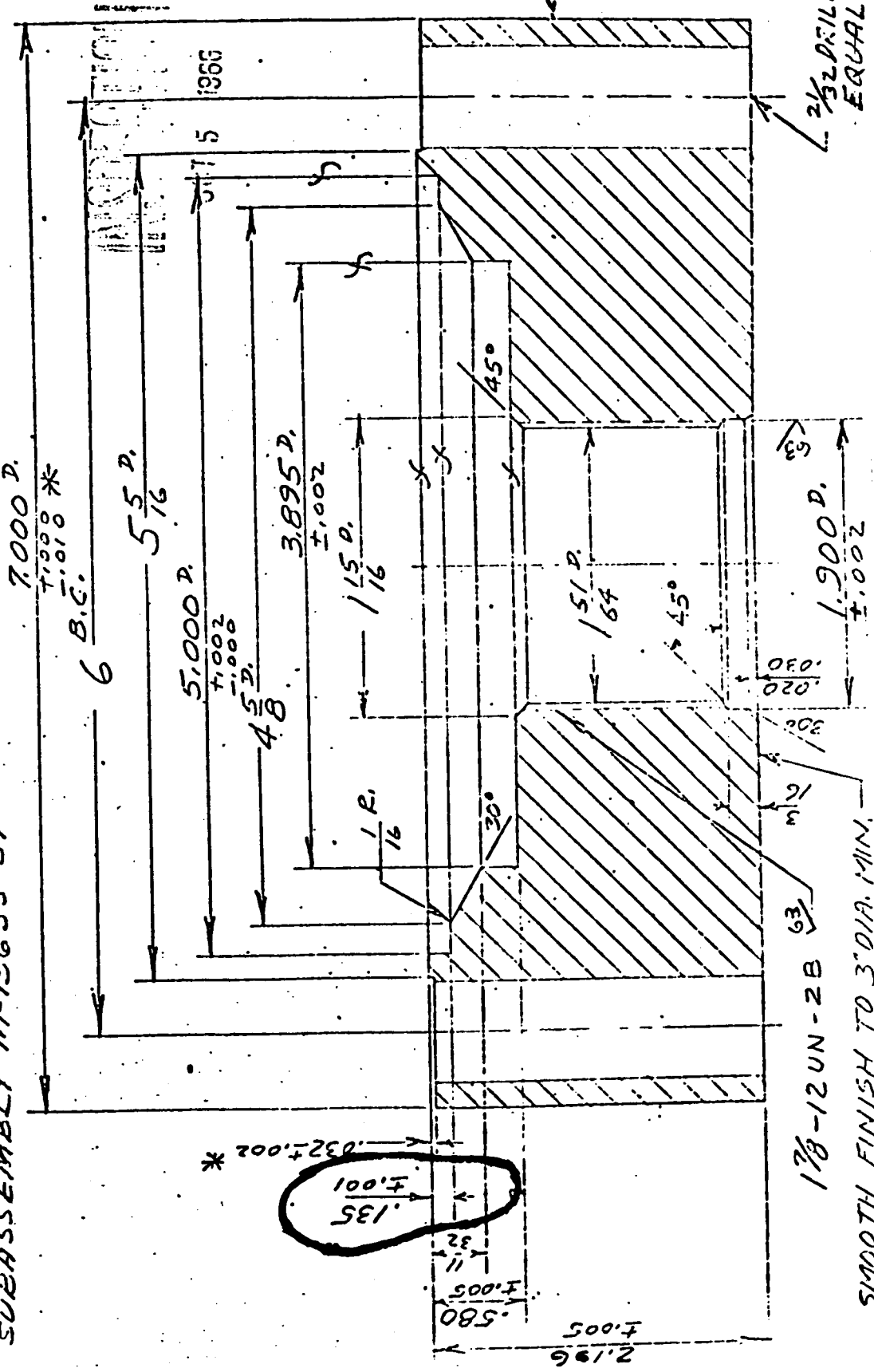


Figure 7-3. Vendor Drawing M-13635-36

PASSIVATE PER GROVE SPEC. WT-1

DRILL & TAP $\frac{1}{2}$ N.P.T.
AS PER CHART X-43
TYPE "B" TAP THD. GAGE
NOTCH TO BE $\frac{.003}{.041}$ BELOW
TOP OF DOME. $\frac{3}{32}$ DRILL THRU

2 1/32 DRILL - 12 HOLES
EQUALLY SPACED.

CUT. SLOT $\frac{1}{32} \times \frac{1}{32} \times$
THRU ORIFICE.

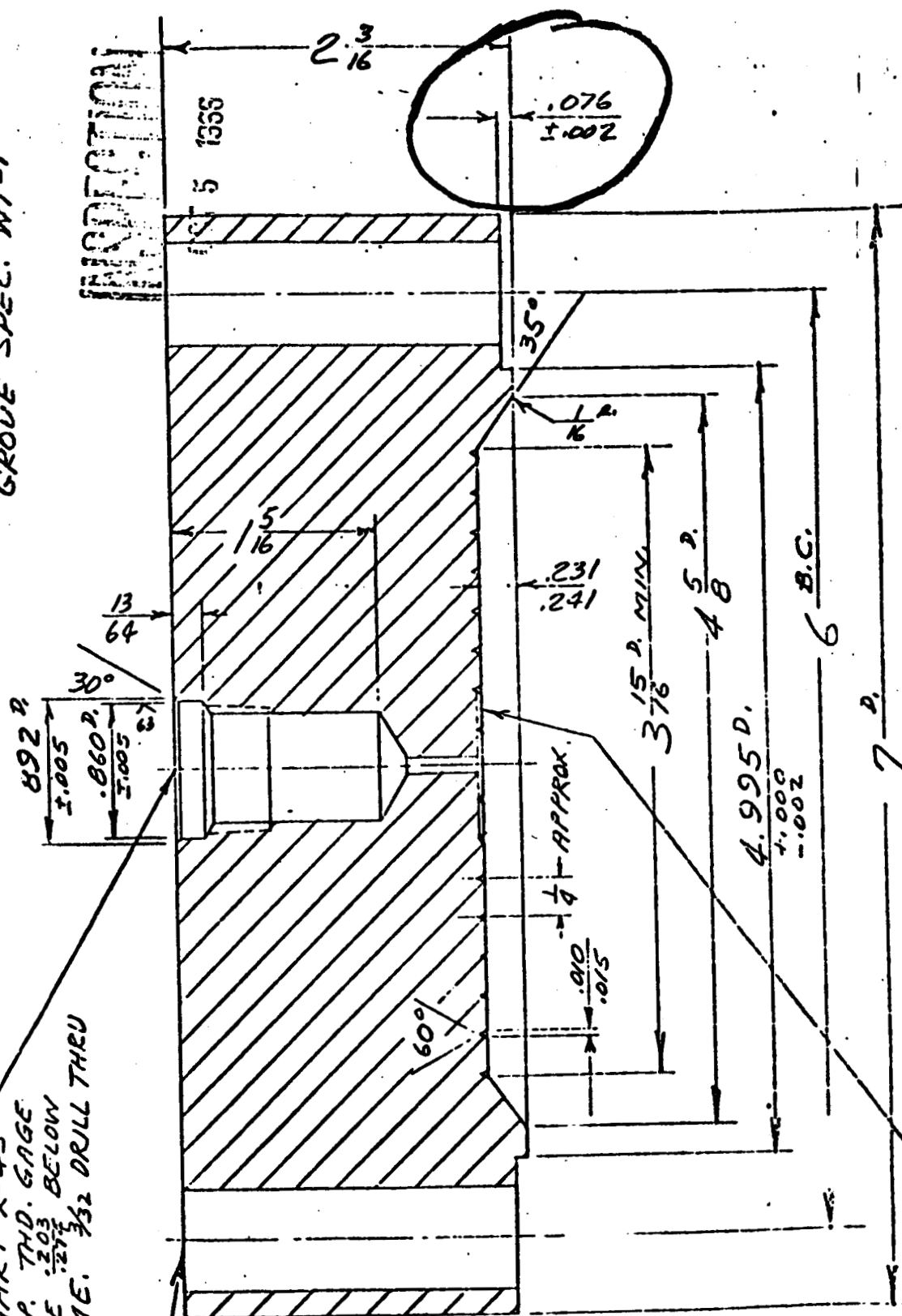


Figure 7-4. Vendor Drawing M-13635-38

APPROVAL

TEST REPORT

FOR

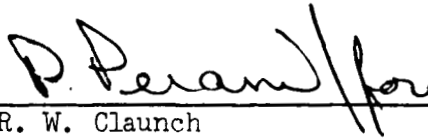
BACK PRESSURE REGULATOR, 2 $\frac{1}{2}$ -INCH GRAYLOC CONNECTIONS, 6000 PSIG
Grove Valve and Regulator Company Drawing Number M-13636-R, Model PB 300
NASA Drawing Number 10428582

SUBMITTED BY:




Robert N. Marks
Test and Evaluation Section

APPROVALS



R. W. Claunch
Program Supervisor



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Engineering Department

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